

## CLAIMS

### WHAT IS CLAIMED IS:

1. A PON transmission system connecting an optical line terminator on a local exchange side and a plurality of optical network units on a subscriber side, using fiber-optic  
5 cables and an optical star coupler therebetween, wherein:

said optical line terminator on the local exchange side comprises PON transmitting means on the local exchange side for sending out a PON downstream transmission frame to the fiber-optic cable and for receiving a PON upstream transmission frame from the fiber-optic cable,

the PON downstream transmission frame having

an STM signal transmission field set in units of cells and an ATM signal transmission field set in units of cells coexisting therein,

a supervisory control information transmission field storing information on making allocation of said signal transmission fields in units of cells, designating a way to make the STM signal transmission field and the ATM signal transmission field coexist, and

a plurality of cells having fixed lengths,  
and the PON upstream transmission frame having

the STM signal transmission field set in units of cells and the ATM signal transmission field set in units of cells coexisting therein,

the supervisory control information transmission field storing information on making allocation to said transmission fields in units of cells, designating the way to make the STM signal transmission field and the ATM signal transmission field coexist, and

the plurality of cells having fixed lengths; and

said optical network unit on the subscriber side comprises PON transmitting means on the local exchange side for sending out a PON upstream transmission frame to the fiber-optic cable and for receiving a PON downstream transmission frame from the fiber-optic cable,

the PON upstream transmission frame having

the STM signal transmission field set in units of cells and an ATM signal transmission field set in units of cells coexisting therein,

the supervisory control information transmission field storing information on making allocation to said transmission fields in units of cells, designating the way to make the STM signal transmission field and the ATM signal transmission field coexist, and

the plurality of cells having fixed lengths, and the PON downstream transmission frame having

the STM signal transmission field set in units of cells and the ATM signal transmission field set in units of cells coexisting therein,

the supervisory control information transmission field storing information on making allocation to said transmission fields in units of cells, designating the way to make the STM signal transmission field and the ATM signal transmission field coexist, and

the plurality of cells having fixed lengths.

2. The PON transmission system according to claim 1, wherein:

said PON transmitting means on the subscriber side requests the optical line terminator on the local exchange side to set the STM signal transmission field and the ATM signal transmission field on said PON downstream transmission frame, by using a supervisory control information transmission field on the PON upstream transmission frame;

said PON transmitting means on the local exchange side sets the STM signal transmission field and the ATM signal transmission field according to the request, and notifies said PON transmitting means on the subscriber side by using the supervisory control information transmission field on the PON downstream transmission frame; and

said PON transmitting means on the subscriber side and said PON transmitting means on the local exchange side send and receive an STM signal and an ATM signal according to the setting.

3. An ATM-PON transmission system connecting an optical line terminator on a local exchange side and a plurality of optical network units on a subscriber side, using fiber-optic cables and an optical star coupler therebetween, wherein:

said optical line terminator on the local exchange side comprises ATM-PON transmitting means on the local exchange side

for providing a cell in an ATM-PON downstream transmission frame for storing supervisory control information in order to store instructional information to accommodate an STM signal in an ATM-PON transmission frame,

for sending out the ATM-PON downstream transmission frame to the fiber-optic cable with the STM signal transmission field and an ATM signal transmission field coexisting therein according to the instructional information, and

for receiving an ATM-PON upstream transmission frame from the fiber-optic cable with the STM signal transmission field and the ATM signal transmission field coexisting therein according to the instructional information; and wherein

said optical network unit on the subscriber side comprises ATM-PON transmitting means on the subscriber side for sending out the ATM-PON upstream transmission frame to the fiber-optic cable with the STM signal transmission field and the ATM signal transmission field coexisting therein according to the instructional information, and for receiving the

ATM-PON downstream transmission frame from the fiber-optic cable with the STM signal transmission field and the ATM signal transmission field coexisting therein.

4. An optical network unit of an ATM-PON transmission system connecting an optical line terminator on a local exchange side and a plurality of optical network units on a subscriber side, using fiber-optic cables and an optical star coupler therebetween, comprising:

extracting means for extracting instructional information to accommodate an STM signal in an ATM-PON transmission frame, said instructional information being stored in a cell which is for storing supervisory control information and which is in the ATM-PON transmission frame sent out from the optical line terminator on the local exchange side; and

transmitting means for inserting the STM signal into the cell according to the extracted instructional information, and for transmitting the ATM-PON transmission frame with the STM signal and an ATM signal coexisting therein.

5. An optical line terminator of an ATM-PON transmission system connecting an optical line terminator on a local exchange side and a plurality of optical network units on a subscriber side, with using fiber-optic cables and an optical star coupler therebetween, comprising:

transmitting means for storing instructional information to accommodate an STM signal in a cell in an ATM-PON transmission frame for storing supervisory control information, for inserting the STM signal into the cell in the ATM-PON transmission frame, according to the instructional information, and for transmitting the STM signal and an ATM signal coexisting in the ATM-PON transmission frame.